

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An image forming method for forming an image using an image forming apparatus comprising:

~~developing means~~ a developing unit for containing a two-component developer including toner and carrier;

a toner density detecting ~~means~~ unit for detecting a toner density in the developing ~~means~~ unit;

a humidity detecting ~~means~~ unit for detecting humidity information around the developing ~~means~~ unit;

a toner supply ~~means~~ unit for supplying toner to the developing means;

a toner supply control ~~means~~ unit for controlling the toner supply ~~means~~ unit by comparing an output value from the toner density detecting ~~means~~ unit with a toner density reference value stored in memory ~~means~~ unit; and

an image density correction control ~~means~~ unit for forming a reference developing image based on a set value of a predetermined image forming condition, detecting a density of the formed reference developing image, and correcting the set value,

the method ~~being characterized by~~ comprising:

a determination step for determining whether or not a set value of an image forming condition has been corrected beyond a predetermined range with respect to an initial value;

a humidity detection step for detecting humidity by the humidity detecting ~~means~~unit when a determination is made in the determination step that a correction value with respect to the initial value exceeds the predetermined range;

a correction value determination step for determining a correction value of the toner density reference value, based on the humidity detected in the humidity detection step; and

a step of correcting the toner density reference value using the correction value of the toner density reference value determined in the correction value determination step.

2. (Original) The image forming method as set forth in claim 1, wherein

the determination step is a first determination step for determining whether or not a correction value with respect to the initial value of the set value of the image forming condition is equal to or larger than a comparative reference value, and further comprises

a second determination step for determining that the correction value is negative when a determination is made in the first determination step that the correction value is not equal to or larger than the comparative reference value, and determining whether or not an absolute value of the correction value is equal to or larger than the comparative reference value, and

the humidity detection step is a step of detecting humidity when a determination is made in the first determination step or the second determination step that the absolute value of the correction value is equal to or larger than the comparative reference value.

3. (Original) The image forming method as set forth in claim 2, wherein

the comparative reference value differs depending on whether the correction value of the set value of the image forming condition is positive or negative.

4. (Currently Amended) The image forming method as set forth in claim 2-~~or 3~~, further comprising a humidity change determination step for determining whether or not the humidity detected in the humidity detection step has changed and become lower by an amount equal to or larger than a predetermined value from the humidity when the toner density reference value was corrected previously, when a determination is made in the first determination step that the correction value is equal to or larger than the comparative reference value,

wherein when a determination is made in the humidity change determination step that the humidity has changed and become lower by an amount equal to or larger than the predetermined value, a correction value of the toner density reference value is determined based on the changed value to increase a supply amount of toner by the correction value determination step.

5. (Currently Amended) The image forming method as set forth in claim 2-~~or 3~~, further comprising:

a humidity change determination step for determining whether or not the humidity detected in the humidity detection step has changed and become lower by an amount equal to or larger than a predetermined value from the humidity when the toner density reference value was corrected previously, when a determination is made in the first determination step that the correction value is equal to or larger than the comparative reference value; and

a step of determining a correction value of the toner density reference value to increase a supply amount of toner, when a determination is made in the humidity change determination step that the humidity change is a change within the predetermined value.

6. (Original) The image forming method as set forth in claim 5,

wherein said step is a step of determining the correction value by a correction value of the image forming condition.

7. (Currently Amended) The image forming method as set forth in claim 2-~~or 3~~, further comprising a humidity change determination step for determining whether or not the humidity detected in the humidity detection step has changed and become higher by an amount equal to or

larger than a predetermined value from the humidity when the toner density reference value was corrected previously, when a determination is made in the second determination step that the correction value of the image forming condition is negative and the absolute value of the correction value is equal to or larger than the comparative reference value,

wherein when a determination is made in the humidity change determination step that the humidity has changed and become higher by an amount equal to or larger than the predetermined value, a correction value of the toner density reference value is determined based on the changed value to decrease a supply amount of toner.

8. (Currently Amended) The image forming method as set forth in claim 2-~~or 3~~, further comprising:

a humidity change determination step for determining whether or not the humidity detected in the humidity detection step has changed and become higher by an amount equal to or larger than a predetermined value from the humidity when the toner density reference value was corrected previously, when a determination is made in the second determination step that the correction value of the image forming condition is negative and the absolute value of the correction value is equal to or larger than the comparative reference value; and

a correction value determination step for determining a correction value of the toner density reference value to decrease a supply amount of toner, when a determination is made in

the humidity change determination step that the humidity change is a change within the predetermined value.

9. (Original) The image forming method as set forth in claim 8,

wherein said step is a step of determining the correction value by a correction value of the image forming condition.

10. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 3 and 7 through 9~~ claim 1, wherein

when making a correction to decrease the supply amount of toner, the correction is performed at one time.

11. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 6~~ claim 1, wherein

when making a correction to increase the supply amount of toner, the correction is made gradually.

12. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 11~~ claim 1, further comprising a step of determining whether or not a detection value outputted by the toner density detecting ~~means~~ unit has reached the toner density reference value after correction, when the toner density reference value is corrected,

wherein when a determination is made in said step that the detection value has reached the toner density reference value after correction, the correction of the toner density reference value is executed.

13. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 12~~ claim 1, further comprising a step of determining whether or not a detection value outputted by the toner density detecting ~~means~~ unit has reached the toner density reference value after correction, when the toner density reference value is corrected,

wherein when a determination is made in said step that the detection value has reached the toner density reference value after correction, the correction of the set value of the image forming condition is executed.

14. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 13~~ claim 1, further comprising:

a step of storing a developer agitation time since an initial time of the developer contained in the developing ~~means-unit~~; and

a step of correcting the toner density reference value using a correction value corresponding to the developer agitation time stored in said step.

15. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 14~~ claim 1, wherein

the correction of the image forming condition is one or a plurality of corrections on a development bias voltage value applied to develop an electrostatic latent image, a charging voltage value for charging a photoreceptor, a transfer voltage value for transferring the developing image to a transfer material, and an exposure amount for exposing the photoreceptor.

16. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 15~~ claim 1, further comprising:

a step of measuring an elapsed time since forming an image;

a step of determining whether or not the measured elapsed time exceeds a predetermined time; and

a step of determining a correction value of the toner density reference value based on the elapsed time, regardless of an output value from the toner density detecting ~~means-unit~~, when a

determination is made in the determination step that the elapsed time exceeds the predetermined time.

17. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 15~~ claim 1, further comprising:

a step of measuring an elapsed time since forming an image; and

a step of determining a correction value of the toner density reference value, based on a previous output value from the toner density detecting ~~means~~ unit and the elapsed time.

18. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 17~~ claim 1, further comprising:

a step of measuring a continuous supply time in which the toner is continuously supplied since the start of toner supply;

a step of determining whether or not the measured continuous supply time exceeds a predetermined time; and

a step of restricting forming an image, when a determination is made in the determination step that the continuous supply time exceeds the predetermined time.

19. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 18~~ claim 1, further comprising:

a step of measuring an accumulated elapsed time required for an image forming process after supplying the toner;

a step of determining whether or not the measured accumulated elapsed time exceeds a predetermined time; and

a step of starting to supply a predetermined amount of toner by the toner supply ~~means~~ unit, regardless of an output value from the toner density detecting ~~means~~ unit, when a determination is made in the determination step that the accumulated elapsed time exceeds the predetermined time.

20. (Currently Amended) The image forming method as set forth in claim 19, further comprising:

a step of returning the accumulated elapsed time to an initial value without supplying toner, when the output value of the toner density detecting ~~means~~ unit is smaller than the toner density reference value determined in the correction value determination step by a predetermined amount.

21. (Original) The image forming method as set forth in claim 19, further comprising:

a step of returning the accumulated elapsed time to an initial value when the correction value of the toner density reference value determined in the correction value determination step is positive.

22. (Currently Amended) The image forming method as set forth in claim 19, further comprising:

a step of interrupting the measurement of the accumulated elapsed time until the toner density detected by the toner density detecting ~~means-unit~~ reaches the toner density reference value after correction, after supplying toner by the toner supply ~~means-unit~~ based on the toner density reference value after correction, when the correction value of the toner density reference value determined in the correction value determination step is positive.

23. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 22~~ claim 1, wherein

an average particle diameter of toner is within a range of 4 to 7 μm .

24. (Currently Amended) The image forming method as set forth in ~~any one of claims 1 through 23~~ claim 1, wherein

a content of pigment in toner is within a range of 8 to 20 %.

25. (Currently Amended) An image forming apparatus ~~including~~ comprising:

a developing ~~means-unit~~ for containing a two-component developer including toner and carrier;

a toner density detecting ~~means-unit~~ for detecting a toner density in the developing ~~means-unit~~;

a humidity detecting ~~means-unit~~ for detecting humidity information around the developing ~~means-unit~~;

a toner supply ~~means-unit~~ for supplying toner to the developing ~~means-unit~~;

a toner supply control ~~means-unit~~ for controlling the toner supply ~~means-unit~~ by comparing an output value from the toner density detecting ~~means-unit~~ with a toner density reference value stored in memory ~~means-unit~~; and

an image density correction control ~~means-unit~~ for forming a reference visible image based on a set value of a predetermined image forming condition, detecting a density of the formed reference visible image, and correcting the set ~~value,value~~;

~~the apparatus being characterized by comprising:~~

~~means~~ a judging unit for determining whether or not a set value of an image forming condition has been corrected beyond a predetermined range with respect to an initial value;

~~means a detecting unit~~ for detecting a humidity change by monitoring an output of the humidity detecting ~~means-unit~~, when said ~~means-unit~~ determines that a correction value with respect to the initial value exceeds the predetermined range;

~~means a determining unit~~ for determining a correction value of the toner density reference value, based on the humidity change detected by ~~said means~~ the detecting unit; and

~~means a correcting unit~~ for correcting the toner density reference value using the correction value determined by ~~said means~~ the determining unit.

26. (Original) The image forming apparatus as set forth in claim 25, comprising a developing device for containing developers of a plurality of colors.

27. (Currently Amended) The image forming apparatus as set forth in claim 25 or 26, comprising a detachable toner container ~~means-unit~~ for storing toner to be supplied by the toner supply ~~means-unit~~,

wherein the toner container ~~means-unit~~ includes a recording unit for recording information about use status.

28. (Currently Amended) The image forming apparatus as set forth in claim 27,
comprising:

~~means a measuring unit~~ for measuring an accumulated time required for supply by the
toner supply ~~means; unit, and~~

~~means for recording wherein the recording unit of the toner container unit records the use~~
~~status based on the measured accumulated time in the recording unit of the toner container~~
~~means.~~

29. (Currently Amended) ~~The image forming apparatus as set forth in claim 27 or 28,~~
~~comprising:~~

~~means for reading the information about the use status recorded in the recording unit of~~
~~the toner container means; and~~

~~means for changing a preset operating condition when the read information about the use~~
~~status is information indicating an unused status.~~ The image forming apparatus as set forth in
claim 27, comprising:

a recording unit for reading the information about the use status recorded in the
recording unit of the toner container unit; and

a changing unit for changing a preset operating condition when the read information about the use status is information indicating an unused status.